

Changes in parameters of deposits No. 301, 302, 303 of Romashkinskoye oil field in modeling reservoir conditions

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Abstract

Parameters of the carbonate rocks of the oil deposits of 301, 302 and 303 of Romashkinskoye field were estimated on 69 core samples. Modelling of reservoir conditions during deposits development was carried out using IFES-1 facility (Republic of Bashkortostan, Oktyabrsky, VNIIGIS). We estimated true resistivity, P-wave velocity and the porosity before loading the sample and after load removal. Samples were placed in a chamber and the measurements were made under conditions close to the reservoir ones. Loading configuration intended constant confining pressure (rock pressure) and changes in pore (reservoir) pressure. At each stage of reservoir pressure changing it has been given a certain period (30 min) to complete the transition process. Two months after the measurement (after full restoration of elasto-mechanical properties) we determined gas permeability of samples again. Porosity of Vereiskian rocks was 3-20 %, of Bashkirian - 1.5-21 %, of Protvinskian - 0.2-23 %. We considered two variants of the technology-related loading: soft and hard. In the soft mode pore (reservoir) pressure reduced from maximum (6.56-7.15 MPa) to an average value (2.24-4.0 MPa) and then restored to maximum. In the hard mode pressure reduced from maximum pore (reservoir) pressure to average value, decreased to minimum (1.0-0.2 MPa) and then restored to maximum. We determined that rocks parameters had not significantly changed under soft mode of technology-related loading. Under hard mode of loading porosity decreased, true resistivity and P-wave velocity grew up. Comparative analysis shows that for the majority of collector of the Vereiskian and Bashkirian productive horizons gas permeability is characterized by reduction of porosity. In case of Protvinskian high fractured rocks gas permeability increases sometimes.

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Keywords

Oil deposits no. 301-303, Oil field development, Reservoir conditions modelling, Rocks parameters

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